

REMARKS

Reconsideration of this application, as amended, is respectfully requested. The following remarks are responsive to the Final Office Action mailed July 15, 2002.

Claims 1-88 are pending in the present application. Claims 1, 12, 21, 32, 41, 52, 61, 72, and 81 have been amended. Applicants respectfully submit that the amendments made herein do not add new matter.

Claims 1, 12, 21, 32, 41, 52, 61, 72, and 81, were rejected under 35 U.S.C. 112, second paragraph, because it is unclear whether the match value or relative entropy is calculated.

Claims 1-88 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,033,087 to Bahl ("Bahl").

Claim Rejections under 35 U.S.C. § 112

Claims 1, 12, 21, 32, 41, 52, 61, 72, and 81, were rejected under 35 U.S.C. 112, second paragraph, because it is unclear whether the match value or relative entropy is calculated. Claims 1, 12, 21, 32, 41, 52, 61, 72, and 81 have been amended to address the Examiner's rejection. Applicants believe that the amendments made herein overcome the § 112 rejection and respectfully request withdrawal of the rejection.

Claim Rejections under 35 U.S.C. § 103(a)

Claims 1-88 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,033,087 to Bahl ("Bahl").

Applicants respectfully submit that Bahl fails to teach, suggest, or render obvious the present invention as claimed.

Independent claims 1, 21, 41, 61, and 81, as amended, recite a method and system for evaluating similarity among a plurality of data structures comprising, *inter alia*, "generating a match value using a relative entropy value corresponding to said at least one matching entry, said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries." (Emphasis added). Independent claims 12, 32, 52, and 72, as amended, recite a method and system for evaluating similarity among a plurality of data structures comprising, *inter alia*, "calculating a relative entropy value corresponding to each entry of said plurality of entries, said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries." (Emphasis added).

The Office Action states that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of Bahl in order to arrive at the present invention as claimed.

Applicants disagree for the following reasons.

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the

references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Bahl discloses a method and apparatus for processing speech information to automatically generate phonological rules, which may be used, for example, to facilitate the recognition of continuous speech. *See* col. 1, lines 9-14. The speech recognition system includes a set of language components that describe a predetermined vocabulary of words. Vocalizations corresponding to a known text are processed to associate samples, representing the vocalizations, with the language components. The samples associated with language components that are phonologically similar are clustered to determine the different pronunciations of that component. These samples are then processed to develop a decision mechanism which relates the clusters to data indicating the contextual occurrence of the language components represented by the samples. This decision graph defines phonological rules, which describe variations in the pronunciation of the various language components due to the context in which the component occurs. *See* col. 2, lines, 46-61.

Bahl fails to teach or suggest “generating a match value using a relative entropy value corresponding to said at least one matching entry, said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries,” as claimed in independent claims 1, 21, 41, 61, and 81, as amended. Furthermore, Bahl fails to teach or suggest “calculating a relative entropy value corresponding to each entry of said plurality of entries, said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries,” as claimed in independent claims 12, 32, 52, and 72, as amended.

The Office Action cites cols. 16-17, lines 66-3, and states that Bahl implicitly indicates the step of the cluster number annotations of the set of sequences being used to determine the amount of disorder or entropy of the set and the context annotations being used to subdivide the set to produce having less disorder than the parent set, which is readable as generating a match value using a relative entropy value corresponding to said at least one matching entry. *See* Office Action, pages 4-6. Furthermore, the Office Action cites col 18, lines 11-68 and states that Bahl further teaches that a frequency distribution P of the parent node and equation (4) are used to calculate the conditional entropy H_u of the checking data at that node.

However, Applicants respectfully submit that the paragraphs cited in the Office Action fail to teach or suggest a relative entropy value corresponding to each entry and being calculated relative to an entropy value of a root entry of

said plurality of entries, as claimed in independent claims 1, 12, 21, 32, 41, 52, 61, 72, and 81, as amended. At most, Bahl teaches determination of the amount of entropy of a set of sequences and subdivision of the set to produce subsets having less entropy than the parent set (*See* cols. 16-17, line 66-3), and calculation of a conditional entropy value H_u based on a frequency distribution \underline{P} that describes the parent node (*See* col. 18, lines 58-61). Furthermore, the cited paragraphs fail to teach or suggest generation of a match value using the calculated relative entropy value, as claimed in independent claims 1, 12, 21, 32, 41, 52, 61, 72, and 81, as amended.

In addition, nothing in Bahl appears to suggest the desirability of including such a calculation in the teachings of Bahl. Accordingly, there appears to be no motivation for the suggested combination and the Office Action cites no such motivation other than that provided by the present application. It would be impermissible hindsight based on Applicants' own disclosure to incorporate the alleged teachings into Bahl.

Therefore, Applicants respectfully submit that it would not have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of Bahl to include "generating a match value using a relative entropy value corresponding to said at least one matching entry, said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries," as claimed in independent claims 1, 21, 41, 61, and 81, as amended, or to include "calculating a relative entropy

value corresponding to each entry of said plurality of entries, said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries," as claimed in independent claims 12, 32, 52, and 72, as amended, in order to arrive at the present invention as claimed.

Thus, Applicants submit that claims 1, 12, 21, 32, 41, 52, 61, 72, and 81, as amended, are distinguishable over Bahl and should be allowed. Claims 2-11, 13-20, 22-31, 33-40, 42-51, 53-60, 62-71, 73-80, and 82-88, dependently directly or indirectly from independent claims 1, 12, 21, 32, 41, 52, 61, 72, and 81, respectively, are also distinguishable over Bahl at least for the same reasons as stated above and should also be allowed.

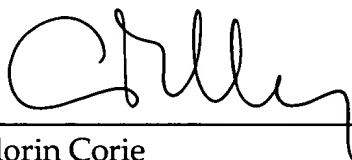
If the Examiner believes a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Florin Corie at (408) 947-8200 ext. 206.

If there are any additional charges, please charge them to Deposit Account No. 02-2666.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

A marked up version of the claims is provided below.

Additions are indicated with “___” and deletions are indicated within “[].”

1. (Twice Amended) A method for evaluating similarity among a plurality of data structures, comprising:

- analyzing each structure of said plurality of data structures to generate at least one substructure;
- matching said at least one substructure to a database having a plurality of entries to obtain at least one matching entry; and
- generating a match value using a relative entropy value corresponding to said at least one matching entry [and], said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries.

2. (Unchanged) The method according to claim 1, further comprising: creating said plurality of entries in said database; and processing said plurality of entries in said database.

3. (Unchanged) The method according to claim 2, wherein said creating further comprises creating said plurality of entries using a tool having a graphical user interface and exporting said plurality of entries to said database.

4. (Unchanged) The method according to claim 2, wherein said processing further comprises:

- verifying said plurality of entries for validity; and
- calculating said relative entropy value corresponding to each entry of said plurality of entries.

5. (Unchanged) The method according to claim 4, wherein said processing further comprises storing said each entry of said plurality of entries together with said corresponding relative entropy value in a compressed format.

6. (Unchanged) The method according to claim 1, further comprising extracting from a lexicon database having a plurality of elements each element associated to said each structure, assigning at least one code of said each element to said each structure, and retrieving said at least one code during matching to obtain said at least one matching entry.

7. (Unchanged) The method according to claim 6, further comprising reading lexical probability files and assigning a probability value to said each element of said plurality of elements in said lexicon database.

8. (Unchanged) The method according to claim 1, wherein each structure of said plurality of data structures is a representation of a linguistic expression.

9. (Amended) The method according to claim 4, wherein said database is a thesaurus hierarchy including said root entry, said plurality of entries depending from said root entry.

10. (Unchanged) The method according to claim 9, wherein said relative entropy value corresponding to said each entry of said plurality of entries is calculated based on an entropy value of said each entry and an entropy value of said root entry.

11. (Unchanged) The method according to claim 6, wherein said each element in said lexicon database is a word.

12. (Twice Amended) A method for evaluating similarity among a plurality of data structures comprising:

creating a plurality of entries in a database; and

calculating a relative entropy value corresponding to each entry of said plurality of entries, said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries.

13. (Unchanged) The method according to claim 12, further comprising storing said each entry of said plurality of entries together with said corresponding relative entropy value in a compressed format.

14. (Unchanged) The method according to claim 12, further comprising:
creating said plurality of entries using a tool having a graphical user interface; and
exporting said plurality of entries to said database.

15. (Unchanged) The method according to claim 12 further comprising:
analyzing each structure of said plurality of data structures to generate at least one substructure;

matching said at least one substructure of said each structure to said database to obtain at least one matching entry; and

generating a match value using said relative entropy value corresponding to said at least one matching entry.

16. (Unchanged) The method according to claim 15, further comprising:
verifying said plurality of entries for validity;
extracting from a lexicon database having a plurality of elements each element associated to said each structure;
reading lexical probability files;
assigning a probability value to said each element of said plurality of elements in said lexicon database;
assigning at least one code of said each element to said each structure;
and
retrieving and matching said at least one code to said database to obtain said at least one matching entry.

17. (Unchanged) The method according to claim 16, wherein said each structure of said plurality of data structures is a representation of a linguistic expression.

18. (Amended) The method according to claim 12, wherein said database is a thesaurus hierarchy including said root entry, said plurality of entries depending from said root entry.

19. (Unchanged) The method according to claim 18, wherein said relative entropy value corresponding to said each entry of said plurality of entries is calculated based on an entropy value for said each entry and an entropy value for said root entry.

20. (Unchanged) The method according to claim 15, wherein said each element in said lexicon database is a word.

21. (Twice Amended) A computer readable medium containing executable instructions which, when executed in a processing system, cause the system to perform a method for evaluating similarity among a plurality of data structures, the method comprising:

analyzing each structure of said plurality of data structures to generate at least one substructure;

matching said at least one substructure to a database having a plurality of entries to obtain at least one matching entry; and

generating a match value using a relative entropy value corresponding to said at least one matching entry [and], said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries.

22. (Unchanged) The computer readable medium according to claim 21, wherein the method further comprises:

creating said plurality of entries in said database; and
processing said plurality of entries in said database.

23. (Unchanged) The computer readable medium according to claim 22, wherein said creating further comprises creating said plurality of entries using a tool having a graphical user interface and exporting said plurality of entries to said database.

24. (Unchanged) The computer readable medium according to claim 22, wherein said processing further comprises:

verifying said plurality of entries for validity; and
calculating said relative entropy value corresponding to each entry of said plurality of entries.

25. (Unchanged) The computer readable medium according to claim 24, wherein said processing further comprises storing said each entry of said plurality of entries together with said corresponding relative entropy value in a compressed format.

26. (Unchanged) The computer readable medium according to claim 21, further comprising extracting from a lexicon database having a plurality of elements each element associated to said each structure, assigning at least one code of said each element to said each structure, and retrieving said at least one code during matching to obtain said at least one matching entry.

27. (Unchanged) The computer readable medium according to claim 26, further comprising reading lexical probability files and assigning a probability value to said each element of said plurality of elements in said lexicon database.

28. (Unchanged) The computer readable medium according to claim 21, wherein each structure of said plurality of data structures is a representation of a linguistic expression.

29. (Amended) The computer readable medium according to claim 24, wherein said database is a thesaurus hierarchy including said root entry, said plurality of entries depending from said root entry.

30. (Unchanged) The computer readable medium according to claim 29, wherein said relative entropy value corresponding to said each entry of said plurality of entries is calculated based on an entropy value of said each entry and an entropy value of said root entry.

31. (Unchanged) The computer readable medium according to claim 26, wherein said each element in said lexicon database is a word.

32. (Twice Amended) A computer readable medium containing executable instructions which, when executed in a processing system, cause the system to perform a method for evaluating similarity among a plurality of data structures, the method comprising:

creating a plurality of entries in a database; and

calculating a relative entropy value corresponding to each entry of said plurality of entries, said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries.

33. (Unchanged) The computer readable medium according to claim 32, further comprising storing said each entry of said plurality of entries together with said corresponding relative entropy value in a compressed format.

34. (Unchanged) The computer readable medium according to claim 32, further comprising:

creating said plurality of entries using a tool having a graphical user interface; and

exporting said plurality of entries to said database.

35. (Unchanged) The computer readable medium according to claim 32 further comprising:

analyzing each structure of said plurality of data structures to generate at least one substructure;

matching said at least one substructure of said each structure to said database to obtain at least one matching entry; and
generating a match value using said relative entropy value corresponding to said at least one matching entry.

36. (Unchanged) The computer readable medium according to claim 35, further comprising:

verifying said plurality of entries for validity;
extracting from a lexicon database having a plurality of elements each element associated to said each structure;
reading lexical probability files;
assigning a probability value to said each element of said plurality of elements in said lexicon database;
assigning at least one code of said each element to said each structure;
and
retrieving and matching said at least one code to said database to obtain said at least one matching entry.

37. (Unchanged) The computer readable medium according to claim 36, wherein said each structure of said plurality of data structures is a representation of a linguistic expression.

38. (Amended) The computer readable medium according to claim 32, wherein said database is a thesaurus hierarchy including said root entry, said plurality of entries depending from said root entry.

39. (Unchanged) The computer readable medium according to claim 38, wherein said relative entropy value corresponding to each entry of said plurality of entries is calculated based on an entropy value for said each entry and an entropy value for said root entry.

40. (Unchanged) The computer readable medium according to claim 35, wherein said each element in said lexicon database is a word.

41. (Twice Amended) An article of manufacture comprising a program storage medium readable by a computer and tangibly embodying at least one program of instructions executable by said computer to perform method steps for evaluating similarity among a plurality of data structures, said method comprising:

analyzing each structure of said plurality of data structures to generate at least one substructure;

matching said at least one substructure to a database having a plurality of entries to obtain at least one matching entry; and

generating a match value using a relative entropy value corresponding to said at least one matching entry [and], said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries.

42. (Unchanged) The article of manufacture according to claim 41, wherein the method further comprises:

creating said plurality of entries in said database; and

processing said plurality of entries in said database.

43. (Unchanged) The article of manufacture according to claim 42, wherein said creating further comprises creating said plurality of entries using a tool having a graphical user interface and exporting said plurality of entries to said database.

44. (Unchanged) The article of manufacture according to claim 42, wherein said processing further comprises:
verifying said plurality of entries for validity; and
calculating said relative entropy value corresponding to each entry of said plurality of entries.

45. (Unchanged) The article of manufacture according to claim 44, wherein said processing further comprises storing each entry of said plurality of entries together with said corresponding relative entropy value in a compressed format.

46. (Unchanged) The article of manufacture according to claim 41, wherein the method further comprises:
extracting from a lexicon database having a plurality of elements each element associated to said each structure;
assigning at least one code of said each element to said each structure;
and
retrieving said at least one during matching to obtain said at least one matching entry.

47. (Unchanged) The article of manufacture according to claim 46, wherein the method further comprises reading lexical probability files and

assigning a probability value to said each element of said plurality of elements in said lexicon database.

48. (Unchanged) The article of manufacture according to claim 41, wherein each structure of said plurality of data structures is a representation of a linguistic expression.

49. (Amended) The article of manufacture according to claim 44, wherein said database is a thesaurus hierarchy including said root entry, said plurality of entries depending from said root entry.

50. (Unchanged) The article of manufacture according to claim 49, wherein said relative entropy value corresponding to said each entry of said plurality of entries is calculated based on an entropy value of said each entry and an entropy value of said root entry.

51. (Unchanged) The article of manufacture according to claim 46, wherein said each element in said lexicon database is a word.

52. (Twice Amended) An article of manufacture comprising a program storage medium readable by a computer and tangibly embodying at least one program of instructions executable by said computer to perform method steps for evaluating similarity among a plurality of data structures, said method comprising:

creating a plurality of entries in a database; and

calculating a relative entropy value corresponding to each entry of said plurality of entries , said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries.

53. (Unchanged) The article of manufacture according to claim 52, wherein the method further comprises storing said each entry of said plurality of entries together with said corresponding relative entropy value in a compressed format.

54. (Unchanged) The article of manufacture according to claim 52, wherein the method further comprises:

creating said plurality of entries using a tool having a graphical user interface; and

exporting said plurality of entries to said database.

55. (Unchanged) The article of manufacture according to claim 52, wherein the method further comprises:

analyzing each structure of said plurality of data structures to generate at least one substructure;

matching said at least one substructure of said each structure to said database to obtain at least one matching entry; and

generating a match value using said relative entropy value corresponding to said at least one matching entry.

56. (Unchanged) The article of manufacture according to claim 55, wherein the method further comprises:

verifying said plurality of entries for validity;

extracting from a lexicon database having a plurality of elements each element associated to said each structure;
reading lexical probability files;
assigning a probability value to said each element of said plurality of elements in said lexicon database;
assigning at least one code of said each element to said each structure;
and
retrieving and matching said at least one code to said database to obtain said at least one matching entry.

57. (Unchanged) The article of manufacture according to claim 56, wherein said structure of said plurality of data structures is a representation of an linguistic expression.

58. (Amended) The article of manufacture according to claim 52, wherein said database is a thesaurus hierarchy including said root entry, said plurality of entries depending from said root entry.

59. (Unchanged) The article of manufacture according to a claim 58, wherein said relative entropy value corresponding to said each entry of said plurality of entries is calculated based on an entropy value for said each entry and an entropy value for said root entry.

60. (Unchanged) The article of manufacture according to claim 55, wherein said each element in said lexicon database is a word.

61. (Twice Amended) A system for evaluating similarity among a plurality of data structures, comprising:

- means for analyzing each structure of said plurality of data structures to generate at least one substructure;
- means for matching said at least one substructure to a database having a plurality of entries to obtain at least one matching entry; and
- means for generating a match value using a relative entropy value corresponding to said at least one matching entry [and], said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries.

62. (Unchanged) The system according to claim 61, further comprising:

- means for creating said plurality of entries in said database; and
- means for processing said plurality of entries in said database.

63. (Unchanged) The system according to claim 62, wherein said creating means further comprises means for creating said plurality of entries using a tool having a graphical user interface and exporting said plurality of entries to said database.

64. (Unchanged) The system according to claim 62, wherein said processing means further comprises:

- means for verifying said plurality of entries for validity; and
- means for calculating said relative entropy value corresponding to each entry of said plurality of entries.

65. (Unchanged) The system according to claim 64, wherein said processing means further comprises means for storing said each entry of said plurality of entries together with said corresponding relative entropy value in a compressed format.

66. (Unchanged) The system according to claim 61, further comprising:
means for extracting from a lexicon database having a plurality of elements each element associated to said each structure;
means for assigning at least one code of said each element to said each structure; and
means for retrieving said at least one code during matching to obtain said at least one matching entry.

67. (Unchanged) The system according to claim 66, further comprising:
means for reading lexical probability files; and
means for assigning a probability value to said each element of said plurality of elements in said lexicon database.

68. (Unchanged) The system according to claim 61, wherein each structure of said plurality of data structures is a representation of a linguistic expression.

69. (Amended) The system according to claim 64, wherein said database is a thesaurus hierarchy including said root entry, said plurality of entries depending from said root entry.

70. (Unchanged) The system according to claim 69, wherein said relative entropy value corresponding to said each entry of said plurality of entries is calculated based on an entropy value of said each entry and an entropy value of said root entry.

71. (Unchanged) The system according to claim 66, wherein said each element in said lexicon database is a word.

72. (Twice Amended) A system for evaluating similarity among a plurality of data structures, comprising:
means for creating a plurality of entries in a database; and
means for calculating a relative entropy value corresponding to each entry of said plurality of entries , said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries.

73. (Unchanged) The system according to claim 72, further comprising means for storing said each entry of said plurality of entries together with said corresponding relative entropy value in a compressed format.

74. (Unchanged) The system according to claim 72, further comprising:
means for creating said plurality of entries using a tool having a graphical user interface; and
means for exporting said plurality of entries to said database.

75. (Unchanged) The system according to claim 72, further comprising:
means for analyzing each structure of said plurality of data structures to generate at least one substructure;

means for matching said at least one substructure of said each structure to said database to obtain at least one matching entry; and

means for generating a match value using said relative entropy value corresponding to said at least one matching entry.

76. (Unchanged) The system according to claim 75, further comprising:

means for verifying said plurality of entries for validity;

means for extracting from a lexicon database having a plurality of elements each element associated to said each structure;

means for reading lexical probability files;

means for assigning a probability value to said each element of said plurality of elements in said lexicon database;

means for assigning at least one code of said each element to said each structure; and

means for retrieving and matching said at least one code to said database to obtain said at least one matching entry.

77. (Unchanged) The system according to claim 76, wherein said each structure of said plurality of data structures is a representation of a linguistic expression.

78. (Amended) The system according to claim 72, wherein said database is a thesaurus hierarchy including said root entry, said plurality of entries depending from said root entry.

79. (Unchanged) The system according to claim 78, wherein said relative entropy value corresponding to said each entry of said plurality of entries is

calculated based on an entropy value for said each entry and an entropy value for said root entry.

80. (Unchanged) The system according to claim 75, wherein said each element in said lexicon database is a word.

81. (Twice Amended) A system for evaluating similarity among a plurality of data structures, comprising:

a database having a plurality of entries;

an analyzer, coupled to said database, said analyzer configured to analyze each structure of said plurality of data structure to generate at least one substructure;

a matching unit, coupled to said analyzer and said database, said matching unit configured to match said at least one substructure to at least one entry of said plurality of entries to obtain at least one matching entry; and

an entropy calculator, coupled to said matching unit and said database, configured to generate a match value using a relative entropy value corresponding to said at least one matching entry [and], said relative entropy value being calculated relative to an entropy value of a root entry of said plurality of entries.

82. (Unchanged) The system according to claim 81, wherein said plurality of entries are created offline using a tool having a graphical user interface and are exported to said database.

83. (Unchanged) The system according to claim 81, wherein said entropy calculator further calculates said relative entropy value corresponding to each entry of said plurality of entries.

84. (Unchanged) The system according to claim 83, wherein said database stores said each entry together with said corresponding relative entropy value in a compressed format.

85. (Unchanged) The system according to claim 81, wherein said matching unit further retrieves at least one code from said at least one substructure and matches said at least one code to said at least one entry to obtain said at least one matching entry.

86. (Unchanged) The system according to claim 81, wherein each structure of said plurality of data structures is a representation of a linguistic expression.

87. (Amended) The system according to claim 81, wherein said database is a thesaurus hierarchy including said root entry, said plurality of entries depending from said root entry.

88. (Unchanged) The system according to claim 87, wherein said relative entropy value corresponding to said each entry of said plurality of entries is calculated based on an entropy value of said each entry and an entropy value of said root entry.